

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, July 9, 2004

Resolution #01-04, Offered by: Dr. Harding

Three subcommittees shall be established to gather and analyze information. Subcommittees shall be comprised only of TGDC members. Subcommittees shall propose resolutions to the TGDC on best practices, specifications and standards. Subcommittees shall be named:

- i) Security and Transparency,
- ii) Human Factors and Privacy, and
- iii) Core Requirements and Testing.

I hereby certify the accuracy of Resolution #01-04:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, July 9, 2004

Resolution #02-04, Offered by: Mr. Berger

The Chair shall survey the interest of TGDC members, and thereafter appoint the members and chairs of the subcommittees.

I hereby certify the accuracy of Resolution #02-04:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, July 9, 2004

Resolution #03-04, Offered by: Dr. Harding

Resolutions prepared by the subcommittees shall be considered by the TGDC. Resolutions adopted by the TGDC shall be referred to NIST for technical assistance and editing. Upon return from NIST, the TGDC shall review the resolutions to confirm they conform to its intent.

I hereby certify the accuracy of Resolution #03-04:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, July 9, 2004

Resolution #04-04, Offered by: Ms. Davidson

Adopted resolutions and appropriate explanatory materials comprise the “first set of recommendations” mandated by the Help America Vote Act.

I hereby certify the accuracy of Resolution #04-04:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, July 9, 2004

Resolution #05-04, Offered by: Mr. Craft

The TGDC shall recommend to the EAC that they expedite making currently certified voting software available to the National Software Reference Library as soon as possible.

I hereby certify the accuracy of Resolution #05-04:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee

Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution #01-05, Offered by: Ms. Quesenbery

Title: Work Product Instructions to Staff of National Institute for Standards and Technology (NIST)

The TGDC intends to consider and adopt resolutions during its January 18 and 19, 2005 meeting. Each resolution will make certain findings or conclusions. The resolutions will also request specific technical assistance from NIST.

At the conclusion of the meeting, the TGDC Chair will sort the adopted resolutions by priority. Priority is to be given to resolutions and requests for technical support that can result in work product that will form a part of the April initial recommendations of the TGDC.

Generally, NIST staff members with subject matter expertise will be instructed by the TGDC Chair and his designates to conduct further research and inquiry, gather and evaluate existing standards or standards-like materials which apply to the resolution, and revise such materials or draft new standards or standards-like materials. In many cases, there may be few existing standards materials related to a resolution. In those instances, NIST staff is generally instructed to gather, review, revise, or write relevant standards-related materials. The NIST technical assistance work product will be categorized as pre-decisional materials, and should be provided directly to members of the TGDC for their review.

If, in the course of providing technical assistance, NIST staff discovers significant errors in an adopted resolution or otherwise concludes that to continue providing technical assistance is unwise, technical assistance should be temporarily halted. Such reasons to halt technical assistance may also include discovery that a requested task is technically infeasible, or that the scope of the request exceeds the capabilities or legal authorities of NIST. NIST shall immediately bring the matter to the attention of the TGDC Chair, who will consult with the sponsor of the resolution and the Chair of the applicable subcommittee. If the TGDC Chair, subcommittee Chair and resolution sponsor agree that the request for technical assistance to NIST should be revised, they shall have authority to do so. In such cases, a new or revised request for technical assistance shall be issued to NIST in writing, with copies to all TGDC members. In such cases, the sponsor of the relevant adopted resolution shall examine whether the adopted resolution should be reconsidered or revised during a subsequent meeting of the TGDC. If so, the parliamentarian should be consulted to draft the appropriate resolution materials.

If, in the course of providing technical assistance, NIST staff discovers an alternative approach that logically fits into the scope of an adopted resolution, NIST staff may develop and present the alternate approach. In such cases, NIST staff shall also provide the technical assistance specified in the resolution.

If, in the course of providing technical assistance, NIST staff discovers duplicative or conflicting resolution findings or requests for technical assistance, the TGDC Chair shall be consulted. In such instances, the TGDC Chair shall consult the Chair of the applicable subcommittee and the sponsor of the resolution(s) for clarification. The Chair shall then issue a new written request for technical assistance to NIST and provide copies to TGDC members.

During subsequent meetings of the TGDC, members of the TGDC may consider, amend and adopt the technical assistance work product. Such adopted technical assistance work product will be appended to the appropriate resolution, and will form a portion of the initial recommendations to the Election Assistance Commission.

All work products to be considered by NIST shall be received no later than five working days prior to public meetings by members of the TGDC prior to consideration.

I hereby certify the accuracy of Resolution #01-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution #02-05, Offered by: Ms. Quesenbery
Title: Accessible Voting Systems

The TGDC has concluded that standards for voting systems should include requirements for accessibility that meet the HAVA requirement for accessible voting by incorporating the latest available accessible technology. Further, the TGDC directs NIST to research and draft standards based on, but not limited to, existing requirements from the VSS 2002, IEEE P1583 draft 5.3.2a, *ADA Accessibility Guidelines (ADAAG)*, 36 CFR Part 1194 (section 508) and other relevant usability and accessibility guidelines and federal laws and regulations in order to develop future accessibility requirements for voting systems.

I hereby certify the accuracy of Resolution #02-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution #03-05, Offered by: Ms. Quesenbery
Title: Human Factors and Privacy of Voting Systems at the Polling Place

The TGDC has considered the issue of what is required to ensure both access to the voting system by voters with disabilities, and usability and privacy for all voters. It has concluded that usability, accessibility, and privacy are functions of both the system used to vote and the environment of the polling place. The TGDC directs NIST to research and draft guidance on the deployment and configuration of systems in the polling place to ensure usability, accessibility, and privacy. These guidelines should be combined with the accessibility standards described in Resolution #02-05 or the standards described in Resolution #04-05.

I hereby certify the accuracy of Resolution #03-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution #04-05, Offered by: Ms. Quesenbery

Title: Human Factors and Privacy Requirements for Capturing Indication of a Voter's Choice

The TGDC recognized the need for voting system requirements to include human factors and privacy requirements for capturing indication of a voter's choice based on current research. These requirements should be specified so that systems can be evaluated for meeting the requirements. Unclear specifications, such as “intuitive”, “unambiguous”, or “meaningful” should be avoided. Further, performance-based standards are preferred over specific design standards, because performance standards address the total effectiveness of the system more directly than do design standards and typically they are not technology specific. The TGDC directs NIST to:

1. Create an outline of the human factors and privacy requirements related to capturing indication of a voter's choice,
2. Write draft human factors and privacy standards based on this outline by using existing requirements from the VSS2002, IEEE P1583 draft 5.3.2a, *ADA Accessibility Guidelines (ADAAG)*, 36 CFR Part 1194 (section 508) and other relevant usability and accessibility guidelines and regulations,
3. Identify areas where further requirements development for capturing indication of a voter's choice is needed, noting when performance-based usability standards are possible, and
4. Write all requirements so that they are testable and the tests themselves can be conducted either by inspection by a person with reasonable knowledge of systems, user interface design, and accessibility or by performance-based usability tests with clear, repeatable protocols.

I hereby certify the accuracy of Resolution #04-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution #05-05, Offered by: Ms. Quesenbery

Title: Human Performance-Based Standards and Usability Testing

The TGDC has concluded that voting systems requirements should be based, wherever possible, on human performance benchmarks for efficiency, accuracy or effectiveness, and voter confidence or satisfaction. This conclusion is based, in part, on the analysis in the NIST Report, *Improving the Usability and Accessibility of Voting Systems and Products* (NIST Special Publication 500-256). Performance requirements should be preferred over design requirements. They should focus on the performance of the interface or interaction, rather than on the implementation details. When it is not possible to specify performance requirements (whether because conformance tests cannot be formulated or because they would be too onerous to implement), testable, implementation-neutral design requirements should be used. Conformance tests for performance requirements should be based on human performance tests conducted with human voters as the test participants. The TGDC also recognizes that this is a new approach to the development of usability standards for voting systems and will require some research to develop the human performance benchmarks and the test protocols. Therefore, the TGDC directs NIST to:

1. Create a roadmap for developing performance-based standards, based on the preliminary work done for drafting the standards described in Resolution # 4-05,
2. Develop human performance metrics for efficiency, accuracy, and voter satisfaction,
3. Develop the performance benchmarks based on human performance data gathered from measuring current state-of-the-art technology,
4. Develop a conformance test protocol for usability measurement of the benchmarks,
5. Validate the test protocol, and
6. Document test protocol and benchmarks so that an independent test laboratory can reproduce the testing.

I hereby certify the accuracy of Resolution #05-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution #06-05, Offered by: Ms. Quesenbery
Title: Accommodating a Wide Range of Human Abilities

The TGDC recognizes that there is a wide range of human abilities. The voting population includes not only people with specifically identified disabilities but also the aging population, language minorities, and people with other special needs. A goal of voting system standards should be to accommodate, as much as possible, this wide range of abilities to ensure the greatest usability and accessibility of those systems. This approach is sometimes called “universal design” or “universal usability.” In drafting standards, the TGDC directs NIST to:

1. Consider what accommodations to voter abilities can be included in the standards for all voting systems, using currently available technology, and
2. Develop principles for “universal design” based on existing best practices and other guidelines or standards such as 36 CFR 1194 (Section 508), to guide future standards development to aid in updating the voting system standards.

I hereby certify the accuracy of Resolution #06-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution #08-05, Offered by: Ms. Quesenbery

Title: Usability Guidance for Instructions, Ballot Design, and Error Messages

The TGDC has considered the issue of what is required to improve usability and reduce errors for capturing indication of a voter's choice. It has concluded that usability is a function of the machine used to vote as well as other characteristics of the voting system such as the instructions for voters and poll workers, ballot design, and machine error and help messages. Research and best practices in the areas of plain language design, form design, and usability are potentially relevant to such voting system characteristics. The TGDC directs NIST to research and draft guidelines and standards where possible to improve the usability of instructions, ballot design, and error and help messages in all formats used. These guidelines should be combined with the standards described in Resolution # 4-05.

I hereby certify the accuracy of Resolution #08-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution #09-05, Offered by: Ms. Quesenbery
Title: General Voting System Human Factors and Privacy Considerations

Errors in the voting process are due to human error and the TGDC notes many examples from recent elections to support this statement. While requirements for capturing indication of a voter's choice is the primary area for human factors and privacy standards development, the TGDC recognizes that all proposed requirements that involve human interaction with the voting system should address any possible human factors and privacy implications. Therefore, the TGDC directs NIST to review all proposed requirements, assess which requirements involve user interaction, and perform the evaluation or research needed to ensure that basic usability, accessibility, and privacy is maintained when these requirements are applied to a voting system.

I hereby certify the accuracy of Resolution #09-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 10-05, Offered by: Ms. Quesenbery
Title: Usability of the Standards

The TGDC recognizes the importance of the usability of the voting systems standards. Independent testing laboratories, election officials, and vendors need to understand these standards and also understand how a system is tested for conformance to the standards in order to have confidence in voting systems that pass the conformance tests. Therefore, to the extent possible, the voting system standards should be written in plain language, understandable by both test experts and by voting officials who are not experts in human factors or design.

I hereby certify the accuracy of Resolution #10-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 11-05, Offered by: Ms. Quesenbery

Title: Availability of Voting Machines for Validating Benchmarks and Conformance Test Protocols

The TGDC is aware that the definition and validation of human performance benchmarks and human performance test protocols as described in the NIST Report, *Improving the Usability and Accessibility of Voting Systems and Products* (Special Publication 500-256), requires testing on a set of typical, state-of-the-art voting machines. The TGDC directs NIST to work with the EAC to determine a means to acquire such voting machines and then make them available to enable NIST to perform the work described in Resolution #05-05.

I hereby certify the accuracy of Resolution #11-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution #12- 05, Offered by: Dr. Rivest
Title: Voter Verifiability I

The TGDC has considered the various means by which a voting system allows a voter to verify that his or her vote was captured as the indication of the voter's choice. All voting systems must provide such means, as stated in HAVA 2002 section 301(a)(1)(A)(i). Such voter verification means can be categorized as either "direct," as with optical scan or a machine-generated paper ballot, where the voter can directly examine the representation of his ballot, or "indirect," as with many touch-screen Direct Recording Electronic-- DRE machines, where the voter can only verify the "fundamental representation" of his ballot through the assistance of intervening hardware and/or software.

For voting systems that create more than one representation of the voter's ballot (such as one electronic and one on paper), the TGDC interprets the HAVA language to require that such voter verification must apply to the representation (to be called here the fundamental representation) that is used for the initial vote tabulation.

The TGDC therefore finds it useful to divide voting systems into two categories: those (class DV) where each voter is presented a fundamental representation of his ballot that the voter may directly verify, and those (class IV) not in class DV.

The TGDC has concluded that voting systems in class IV or DV must be held to significantly different security requirements, including different constraints on voting system development, different requirements for system documentation, and different testing to mitigate the different risks associated with each type of voting system.

The TGDC therefore requests that NIST perform research and develop standards documents that:

1. Clarifies the distinction between class DV and class IV voting systems as may be necessary,
2. Elaborates and defines the different requirements to be satisfied by class DV and IV voting systems, and
3. Reviews methods of verification accessible by voters with disabilities.

I hereby certify the accuracy of Resolution #12-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 14-05, Offered by: Dr. Rivest
Title: Commercial Off-The-Shelf Software ("COTS Software")

The TGDC has considered the advisability of using Commercial Off-The-Shelf Software ("COTS Software") within voting systems, from a security perspective. It has concluded that, generally speaking, the use of COTS software introduces excessive and unnecessary risk and should be avoided, while specific well-motivated exceptions to this rule may be required upon occasion. The TGDC directs NIST to research and draft standards documents requiring:

1. That the use of COTS software within voting systems is not allowed unless it meets specific exceptional conditions, and
2. That the criteria for exceptions shall be drafted by NIST.

I hereby certify the accuracy of Resolution #14-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 15-05, Offered by: Dr. Rivest
Title: Software Distribution

The TGDC has concluded that, generally speaking, the manner in which software is loaded onto voting systems is not governed by existing standards, and that it is a significant security issue, that warrants more stringent controls. It is important to know which software has been installed on a voting system, when the software has been installed, and from what sources. Without strict controls on these processes, noncertified software could be loaded onto voting systems, with potentially disastrous results. The TGDC directs NIST to research and draft standards documents requiring:

1. That the distribution of any software to voting systems shall only be performed by means of physically distributed “read only” or “write once” media, including software such as:
 - (a) Operating system required software,
 - (b) Updates and patches,
 - (c) Data files, and
 - (d) Voting system software.
2. That the electronic transmission of any software to voting machines via networks or wireless introduces extreme risk and should be approached with extreme caution,
3. That the software will include an integrity check (such as a digital signature that positively authenticates its source) that must be verified as part of the process of loading the software, and
4. That the record of loading the software will be written permanently to a system audit log kept in write-once memory.

I hereby certify the accuracy of Resolution #15-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 16-05, Offered by: Dr. Rivest
Title: Setup Validation

The TGDC has considered the issue of electronic voting machine setup validation and has concluded that current standards and practice need substantial improvement in this regard. A setup validation method ensures that a voting system contains the authorized software, contains no unauthorized software, and is in the proper initial state. The TGDC requests NIST to do research and develop standards:

1. That specify the characteristics of acceptable setup validation methods (such as, for example, that the setup validation method may not modify the state of the system nor require the execution of any software currently on the system), and
2. That require each voting system submission to specify an acceptable setup validation method.

I hereby certify the accuracy of Resolution #16-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee

Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 17-05, Offered by: Dr. Rivest
Title: Testing

The TGDC directs NIST to research and draft standards documents requiring testing of voting systems that includes a significant amount of open-ended research for vulnerabilities by an analysis team supplied with complete source code and system documentation and operational voting system hardware. The vulnerabilities sought should not exclude those involving collusion between multiple parties (including vendor insiders) and should not exclude those involving adversaries with significant financial and technical resources.

I hereby certify the accuracy of Resolution #17-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 18-05, Offered by: Dr. Rivest
Title: Documentation

The TGDC has concluded that it is critical to the security of voting systems that they be documented thoroughly according to a well-specified set of documentation criteria. Proper documentation is an important and essential part of the input for security evaluation. Voting systems that are not well documented may also be less secure in that poor specification of features and operation can facilitate incorrect operation and improper responses to error conditions and other unexpected events.

This documentation should address all areas of voting system design, architecture, features, controls, and operational modes, and also include recommended management and maintenance procedures. The documentation should specify exactly the operational context of the voting system and all assumptions made affecting the system and how it is operated. It should include all security requirements for operation of the system, including manual, non-computerized procedures. Particular attention should be paid to processes and procedures that reduce security vulnerabilities throughout the entire voting preparation, balloting, counting and audit phases.

The TGDC directs NIST to research and draft standards documents requiring voting system documentation, to include but not be limited to such items as:

1. Voting system design information including source code and discussion of built-in or procedural protections from NIST Special Publication 800-53 such as for:
 - (a) System and information integrity,
 - (b) Identification and authentication,
 - (c) Access control,
 - (d) Audit and accountability, and
 - (e) System and communications protection.
2. Specifications of compatible software or equipment (i.e., operating systems, utilities),
3. Evaluation-related documentation including:
 - (a) Risk assessment information,
 - (b) Results of certification, accreditation, and security assessments, and
 - (c) Contingency planning recommendations.
4. Operational procedures including:
 - (a) Modes and procedures for each mode,
 - (b) Maintenance procedures,
 - (c) Media protection and media loading procedures, and
 - (d) Recount procedures.
5. Awareness and training recommendations,
6. Incident response procedures, and
7. Other information deemed relevant to a security evaluation of the proposed voting system.

The issues of [a] redundant representations of ballots created by the voting system and [b] how recounts of these ballots are to be handled are particularly important. Voting systems that store redundant representations of a cast vote must include, as part of their specification, a detailed description of how such representations may be used in counting votes and recounting votes. The description must also specify what procedures, if any, may (or must) be used to detect discrepancies between the various representations, and how such discrepancies may be resolved.

I hereby certify the accuracy of Resolution #18-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 21-05, Offered by: Dr. Rivest
Title: Multiple Representations of Ballots

Voting systems may create one or more electronic representations of ballots in addition to any paper record produced.. For example, three redundant electronic copies may be made, for reliability purposes. As another example, the scanning of an op-scan ballot may create another, electronic, representation of the ballot. A number of issues are related to the use of multiple representations (both electronic and paper) that are in some cases relatively new and not completely identified or understood, and in other cases need uniform terminology and procedures. These issues include:

1. Preventing, detecting, and handling disagreements between the representations, in the rare event that they should occur,
2. Converting between representations, and ensuring that ballots are not multiply converted and counted,
3. Use of multiple representations in fraud analysis,
4. Authenticity of the representations,
5. Marking of ballot representations with unique identifiers, (if and when possible to do so while preserving voter privacy), and
6. Conversion to/from standard formats.

The TGDC has concluded that further research is advisable in identifying potential problems associated with voting systems that use multiple representations of ballots, and in identifying best approaches for handling such problems. The TGDC thus requests that NIST perform such research and draft standards documents that reflect NIST's determination of the best practices and best approaches for handling these problems.

I hereby certify the accuracy of Resolution #21-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 22-05, Offered by: Dr. Rivest
Title: Federal Standards

Voting systems, while specialized in their purpose, often have many aspects in common with general information technology (IT) systems. Guidelines, standards, and testing programs have been developed for U.S. Government civilian IT systems, typically utilizing ANSI-approved and other voluntary consensus standards, including the Cryptographic Module Validation Program (CMVP) for analysis and testing of cryptographic modules and software, and the National Voluntary Laboratory Accreditation Program (NVLAP) for accreditation of testing laboratories. NIST is currently creating an information security standard (mandated by the Federal Information Security Management Act, specifically, *Recommended Security Controls for Federal Information Systems*, draft NIST Special Publication 800-53) affecting all federal government systems. This draft standard specifies the inclusion and proper use of security-related protections affecting many areas of IT system design and development, management, testing, and operations -- all of which have relevance to voting systems. This and other similar efforts by the U.S. Government have the benefits of having been developed in a public process and having had successful track records with industry.

The TGDC therefore requests that NIST examine existing federal guidelines, standards, and testing programs, and ANSI-approved and other voluntary consensus standards for security in general information technology systems for their relevance and applicability in standards to voting systems, and to draft standards documents that follow such prior guidelines, standards, and programs when possible and where appropriate.

I hereby certify the accuracy of Resolution #22-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 23-05, Offered by: Dr. Rivest
Title: Common Ballot Format Specifications

The TGDC has concluded that the adoption of standard formats for election-related information, such as ballots (both blank and filled-in), has many positive benefits and is worth pursuing. An example of such a standard is OASIS Election Markup Language (EML) Version 4.0, which is an XML-based specification. The TGDC therefore requests NIST to do research and develop standards documents:

1. Specifying what existing election information format standards (or portions thereof or variations thereof) are acceptable for use in voting systems, and
2. Requiring that voting systems use such standards wherever possible.

NIST's evaluation of existing election information standards shall consider fitness for function under existing election codes, security, ease and cost of implementation, and other factors judged relevant by NIST. If no existing election information format standards (or portions thereof, or variations thereof) are judged by NIST, upon its detailed examination, to be acceptable for current use, then NIST should so recommend, and this resolution will have no net effect at this time.

I hereby certify the accuracy of Resolution #23-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 24-05, Offered by: Dr. Schutzer
Title: Conformance Clause

The conformance clause of a standard provides the answers to the important question: what may conform and how? A conformance clause defines, at a high level, what is required of implementers of the specification. The clause may specify minimal requirements for certain functions, as well as extensibility, optional features, and alternative approaches and how they are to be handled. The TGDC requests that NIST draft a conformance clause section for the Voting System Standard.

I hereby certify the accuracy of Resolution #24-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 25-05, Offered by: Dr. Schutzer
Title: Precise and Testable Requirements

For qualification of voting systems to be consistent, fair, and meaningful, it is necessary to control variability in the conformance assessment system. Both the requirements to be tested and the methods by which they are to be tested must be specified with appropriate precision. The TGDC requests that NIST:

1. Conduct a review and analysis of the requirements in the 2002 VSS to ensure that they are sufficiently precise to enable meaningful testing,
2. Include the requirements from the 2002 VSS that are already precise and testable,
3. Write testable requirements for those requirements that are not sufficiently precise,
4. Expand the testing standards in the VSS to specify test methods of those requirements,
5. Update the requirements where appropriate during the review, such as reliability and accuracy specifications, and
6. Adopt, to the extent that NIST determines it is advisable, commonly used equivalent commercial test methods.

I hereby certify the accuracy of Resolution #25-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 26-05, Offered by: Dr. Schutzer
Title: Uniform Testing Methods and Procedures

For consistency and transparency of voting systems testing, and to increase the public trust and confidence in the testing of voting systems, it is necessary that the same set of testing methods and procedures be used by each testing organization. The TGDC requests that NIST draft guidance for how to develop a public set of test methods and procedures.

I hereby certify the accuracy of Resolution #26-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 27-05, Offered by: Dr. Schutzer
Title: Non-Conformant Voting Systems

A provision in the 2002 VSS allows qualification of voting systems that do not conform to the requirements. [*“Any uncorrected deficiency that does not involve the loss or corruption of voting data shall not necessarily be cause for rejection.”*] If there are requirements that are frequently unmet by qualified systems, these requirements should be reviewed for possible elimination. The TGDC requests that NIST review the text of the 2002 VSS to determine if the provision for qualification of voting systems that do not conform to the requirements should be deleted.

I hereby certify the accuracy of Resolution #27-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 28-05, Offered by: Dr. Schutzer
Title: Publicly Available Qualification Data

The TGDC recognizes that public records laws are standard practice in many arenas where public trust and/or safety are at stake. To the extent possible, qualification test reports should be released to the public as evidence that the qualification process was responsibly executed. To handle those cases where release of the entirety of the reports is problematic, the TGDC requests that NIST recommend standards on qualification data to be provided, called a “Public Information Package,” that will set out requirements on the information that must be publicly available and published.

I hereby certify the accuracy of Resolution #28-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 29-05, Offered by: Dr. Schutzer
Title: Ensuring Correctness of Software Code

Volume 1, Section 4.2 and Volume 2, Section 5.4 of the 2002 VSS defines coding standards, as well as a source code review to be conducted by Independent Testing Authorities (ITAs) to enforce those coding standards. These coding standards are a means to an end, the end being an ITA evaluation of the code's correctness to a high level of assurance. The TGDC requests that NIST:

1. Recommend standards to be used in evaluating the correctness of voting system logic, including but not limited to software implementations, and
2. Evaluate the 2002 VSS software coding standards with respect to their applicability to the recommended standards, and either revise them, delete them, or recommend new software coding standards, as appropriate.

I hereby certify the accuracy of Resolution #29-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution #30-05, Offered by: Dr. Schutzer
Title: Quality Management Standards

Volume 1, Sections 7 and 8 and Volume 2, Section 7 of the 2002 VSS require the vendor to follow certain quality assurance and configuration management practices and require the ITA to conduct several audits and documentation reviews to ensure that they were followed. These are a means to ensure that the vendor is capable of following responsible software engineering practices. The TGDC requests that NIST:

1. Review and analyze quality management standards to determine their relevance to voting systems (and their security), and
2. Recommend changes to the VSS quality assurance and configuration management sections based on the findings above.

I hereby certify the accuracy of Resolution #30-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution # 31-05, Offered by: Dr. Schutzer
Title: Maintenance of the VSS

All specifications contain ambiguities that are discovered during testing of implementations. Similarly, all specifications contain requirements that can be subject to multiple, equally defensible interpretations. The TGDC requests that NIST draft a strategy for maintenance of the VSS, which would address the issuance of interpretations of the VSS, the resolution of disputes, and the continuous improvement and revision of the VSS.

I hereby certify the accuracy of Resolution #31-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution #32-05, Offered by: Dr. Schutzer

Title: Sharing Information and De-Qualification of Voting Systems

1. The TGDC recognizes that no conformance assessment process is perfect. Systems with non-conformities, even serious ones, can be granted qualification, only to cause problems at the precinct level after they are deployed. When a serious flaw is discovered in one jurisdiction, other affected jurisdictions should be informed. At present, however, there is no process to de-qualify voting systems that are discovered, after qualification has been granted, to have serious problems. The TGDC requests that NIST define a process and specification for sharing information amongst jurisdictions concerning qualified voting systems that have been discovered to have non-conformities, present problems and known vulnerabilities.

I hereby certify the accuracy of Resolution #32-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee

Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution #33-05, Offered by: Dr. Schutzer
Title: Glossary and Voting Model

The 2002 VSS does not contain a voting model depicting the entire voting process. The current Glossary of Terms needs revision. The TGDC requests that NIST update the 2002 VSS Glossary of Terms and develop a Voting Process Model that incorporates terminology from the revised Glossary to clearly depict the entire voting process and to determine where a voting system fits into this larger process model.

I hereby certify the accuracy of Resolution #33-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution #34-05, Offered by: Dr. Schutzer

Title: Assessment Papers on Recommendations for Future Work

Separate from the immediate work effort to update the 2002 VSS specifications, the TGDC recognizes the need to develop a series of assessment papers that address important issues related to the interrelation of Election Management and VSS systems. These issues are likely to lead to future specifications for VSS systems. The TGDC requests that NIST develop assessment papers that discuss the need for:

1. Standards and tests to support future systems built to support election day verification of voters,
2. Standards for formatting of registration information (possibly using Extensible Markup Language-- XML) to make it easier for states to share information,
3. Tests and standards to validate compensating process, procedures and fixes that address known VSS deficiencies,
4. Better ways to integrate the voting registration process with the rest of the voting process,
5. Standards and tests to support systems that implement absentee voting,
6. Standards and tests to support systems that implement multi-day voting,
7. Standards specifying what existing election information format standards (or portions thereof or variations thereof) are acceptable for use in voting systems,
8. Standards supporting voter interactions and issues of correctly capturing indications of voter choice, and
9. Standards supporting the interrelationship of polling place operation with usability, accessibility and privacy.

I hereby certify the accuracy of Resolution #34-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, January 18 and 19, 2005

Resolution #35-05, Offered by: Dr. Rivest
Title: Wireless

The TGDC has considered the advisability of using wireless technology within voting systems from a security perspective. It has concluded that, for now, the use of wireless technology introduces severe risk and should be approached with extreme caution. The TGDC directs NIST to research and draft standards documents for the use of wireless communications devices in voting systems.

I hereby certify the accuracy of Resolution #35-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, March 9, 2005

Resolution #36-05 Offered by Ms. Caldas
Title: Consensus Standards

The TGDC recognizes the timeframes established in HAVA as necessary to ensure a prompt response to the nation's voting system issues, which it was written to address. The TGDC further recognizes that a robust voluntary consensus standards system exists in this country and should be relied on, to the greatest extent possible, to facilitate the long-term development and regular maintenance of voluntary voting system guidelines and standards.

Moreover, the TGDC encourages the EAC to rely not only on NIST's recognized expertise, but also on the US voluntary consensus standards and conformity assessment systems, as exemplified by programs and standards which comply with the requirements set-forth in OMB Circular A119, as part of the EAC's long-term systemic approach to addressing the nation's continuing need for up-to-date, voluntary voting system guidelines and standards.

I hereby certify the accuracy of Resolution #36-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission

Technical Guidelines Development Committee

Resolution adopted by the TGDC at their plenary meeting, April 20-21, 2005

Resolution #37-05, Offered by: Dr. Semerjian

Title: Work Product Instructions to Chair and Staff of National Institute of Standards and Technology (NIST)

The Technical Guidelines Development Committee (TGDC) intends to consider and adopt Sections of the Final Draft of the initial recommendations to the Executive Director of the Election Assistance Commission (EAC) during its April 20 and 21, 2005 meeting.

Each Section of the Final Draft is to be presented by a NIST staff member, followed by a question and answer session. Immediately thereafter, specific proposals for changes to that Section will be entertained by the TGDC. The Chair will attempt to reach unanimous consent for suggested changes. If unanimous consent is not reached, a TGDC member may make a motion, and a recorded vote will be taken on the matter. At the conclusion of the consideration of each Section, a vote will be taken to adopt the entire Section, as revised by motions adopted through unanimous consent or recorded vote.

At the conclusion of the meeting, the TGDC Chair will assign NIST staff members to revise the Sections as required by votes of the TGDC. The TGDC Chair will supervise this process to assure that revisions reflect the intent of the TGDC as expressed in its votes and resolutions. In supervising the revision process, the TGDC Chair shall not depart from technical decisions made by the TGDC.

The initial recommendations to the Executive Director of the EAC shall consist of the adopted Sections as revised by NIST staff under the supervision of the TGDC Chair. The TGDC Chair is to deliver this work product to the EAC.

Because the work product will have been developed under a tight statutory schedule, the TGDC expects that minor and non-substantive drafting errors may have occurred. NIST is requested to compile relevant corrections in a supplement, which shall be delivered to the TGDC and EAC at an appropriate time.

I hereby certify the accuracy of Resolution #37-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, April 20-21, 2005

Resolution #38-05, Offered by: Dr. Semerjian
Title: Procedural Resolution Regarding "Grandfathering"

Pursuant to HAVA, the TGDC will recommend Voluntary Voting Systems Guidelines (VVSg) to the EAC. Although the VVSg was developed based on current best practices and available technology, the recommendation may not include all practices currently followed or technologies currently utilized by election administrators. Consequently, existing practices in some jurisdictions may not be in compliance with the VVSg. The TGDC finds that whether such practices or technologies not contained within the VVSg should be "grandfathered" is a policy question not within the jurisdiction of the TGDC, and not within the statutory duties of NIST.

I hereby certify the accuracy of Resolution #38-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, April 20-21, 2005

Resolution #39-05-revised, Offered by: Dr. Semerjian
Title: Voter Verified Paper Audit Trail Assignment

The TGDC recognizes that Voter Verified Paper Audit Trails (VVPATs) have been developed in some jurisdictions without guidelines. The TGDC is aware that some states currently require or intend to require use of VVPATs.

During its January 18, 2005 meeting, the TGDC received a request from the EAC to develop VVPAT guidelines for use by states and election jurisdictions that have chosen to require VVPATs so that those states can more effectively implement VVPATs. Subsequently, the TGDC instructed NIST to develop and submit VVPAT formal requirements as a part of its Voluntary Voting Systems Guidelines (VVSG) technical assistance work product.

The TGDC neither endorses nor opposes the use of VVPAT.

I hereby certify the accuracy of Resolution #39-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, April 20-21, 2005

Resolution #40-05, Offered by: Ms. Quesenbery
Title: EAC Consideration of Initial Recommendations

The Technical Guidelines Development Committee (TGDC) recognizes that it will deliver its first set of recommendations to the Executive Director of the Election Assistance Commission (EAC), and that shortly thereafter such recommendations will be reviewed by the EAC and its Board of Advisors and Standards Board. The TGDC is aware of individuals and organizations that wish to provide comments on the recommendations, and is further informed such individuals and organizations may not understand how they can effectively provide such comments.

The TGDC therefore recommends that the EAC announce how and when comments on the initial recommendations may be provided to the EAC for its consideration.

I hereby certify the accuracy of Resolution #40-05:

Craig S. Burkhardt, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, March 29, 2006

Resolution #01-06, Offered by: Mr. Craft
Title: Tracking NIST Work Product to TGDC Resolutions

NIST shall prepare a brief report that tracks the resolutions passed by the TGDC with the progress of standards development and specific work products of NIST. After the initial publication, reports will be provided to the TGDC prior to each public meeting and will be included as an appendix to all NIST and TGDC work products sent to the Election Assistance Commission.

I hereby certify the accuracy of Resolution #01-06:

Philip J. Greene, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, December 4-5, 2006

Resolution #03-06, Offered by: Dr. Rivest
Title: The Innovation Class in VVSG 2007

To spur development of new and innovative secure voting systems, the Technical Guidelines Development Committee (TGDC) directs the Security and Transparency Subcommittee (STS) to include in the next iteration VVSG a new class of voting systems, referred to here as the “Innovation Class.” The TGDC directs STS to investigate high-level, guiding requirements for systems in this class for the purpose of providing system implementers with a path towards achieving certification to the next iteration of the VVSG. STS should also investigate approaches for reviewing, testing, and certifying systems in this class. These approaches could include convening a review board to review submissions and performing expanded open-ended vulnerability testing on systems submitted for certification.

I hereby certify the accuracy of Resolution #03-06:

Philip J. Greene, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, December 4-5, 2006

Resolution #04-06 (Amendment to Resolution # 35-05) Offered by:Dr. Rivest
Title: Wireless Security

The TGDC has considered additional security research since Resolution #35-05 was passed and has concluded that the presence of or capability for any wireless in equipment whose purpose is for official vote casting, counting, and reporting should be prohibited in the next iteration of the VVSG. The sole exception is for infrared wireless, which should only be allowed if the physical path is shielded in addition to the security measures already in VVSG 2005.

I hereby certify the accuracy of Resolution #04-06:

Philip J. Greene, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, December 4-5, 2006

Resolution # 06-06: Offered by Dr. Rivest
Title: Software Independence of Voting Systems

Election officials and vendors have appropriately responded to the growing complexity of voting systems by adding more stringent access controls, encryption, testing, and physical security to election procedures and systems. The TGDC has considered current threats to voting systems and, at this time, finds that security concerns do not warrant replacing deployed voting systems where EAC Best Practices are used.

To provide auditability and proactively address the increasing difficulty of protecting against all prospective threats, the TGDC directs STS to write requirements for the next version of the VVSG requiring the next generation of voting systems to be software independent. The TGDC directs STS and HFP to draft usability and accessibility requirements to ensure that all voters can verify the independent voting record.

The TGDC further directs STS and Core Requirements and Testing Subcommittees (CRT) to draft requirements to ensure that systems that produce independently verifiable voting records are reliable and provide adequate support for audits.

I hereby certify the accuracy of Resolution #06-06:

Philip J. Greene, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, December 4-5, 2006

Resolution 08-06 Offered by Ms. Quesenbery
Title: Recommendation to ICDR

The Interagency Committee on Disability Research (ICDR) sets the agenda for federal disability research, and actively seeks recommendations for future research topics. The TGDC recommends that the ICDR consider the topic of voting system accessibility for one of ICDR's annual conferences.

I hereby certify the accuracy of Resolution #08-06:

Philip J. Greene, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, December 4-5, 2006

Resolution #09-06 Offered by Mr. Berger
Title: Principal Criteria

The TGDC will include in the guidelines as a statement of the overall goal to produce systems with the following attributes:

- Secure
- Accurate
- Reliable
- Usable
- Accessible
- Fit for its intended use

This may allow for the certifying authority to consider whether a candidate's voting system not only is in conformance with the requirements, but also whether it meets the higher level goals.

I hereby certify the accuracy of Resolution #09-06:

Philip J. Greene, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, December 4-5, 2006

Resolution # 10-06: Offered by Mr. Berger
Title: Reliability Metrics

The TGDC concurs with moving away from MTBF (Mean Time Between Failure)
as a reliability metric for voting systems.

I hereby certify the accuracy of Resolution #10-06:

Philip J. Greene, Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, March 22-23, 2007

Resolution # 01-07: Offered by Ms. Quesenbery
Title: Accessibility of Paper-based Voter Verification Requirement

It is the recommendation that the TGDC accept the following language as a voting system requirement:

If the accessible voting station (Acc-VS) generates a paper record (or some other durable, human-readable record) for the purpose of allowing voters to verify their ballot choices, then the system shall provide a mechanism that can read that record and generate an audio representation of its contents. The use of this mechanism shall be accessible to voters with dexterity disabilities.

I hereby certify the accuracy of Resolution #01-07:

Thelma A. Allen , Parliamentarian

U.S. Election Assistance Commission
Technical Guidelines Development Committee
Resolution adopted by the TGDC at their plenary meeting, March 22-23, 2007

Resolution # 02-07: Offered by Mr. Schutzer
Title: Improving Paper Records

Whereas, the TGDC recognizes that paper rolls can be a challenge for voters, poll workers, and audits:

- They can be difficult to handle in an audit or recount,
- The voting order preserved on the roll can be a danger to ballot secrecy if good election management processes are not followed, and
- It can be difficult to make them accessible for blind, low vision, low literacy, second language, or non-written language voters.

Whereas, therefore, the TGDC has determined that the current paper roll solution is acceptable until an alternative, new technology becomes available, and

Resolved: The TGDC directs the subcommittees to develop more demanding requirements for future paper audit trails that can solve the problems posed by today's paper rolls.

I hereby certify the accuracy of Resolution #02-07:

Thelma A. Allen , Parliamentarian